We claim:

1. A method of transmitting N information signals over a single pre-defined frequency channel having a bandwidth of BWc, each of the N information signals being transmitted on a single sub-channel of bandwidth BWsc:

a. modulating each of N information signals to form N modulated signals, each having a bandwidth equal to or less than (BWc - BW_{GB})/N, wherein BW_{GB} corresponds to the collective bandwidth of guardbands inserted between adjacent sub-channels and inserted at each end of the bandwidth of the pre-defined frequency channel, each modulated information signal having a center frequency of F_c;

b. offsetting the center frequency of each modulated signal by a frequency offset individual to that modulated signal, the frequency offset being different for each modulated signal;

c. combining the modulated signals to form a composite signal; and

d. transmitting the composite signal to a terminal.

2. The method of Claim 1 wherein the modulating step comprises mapping groups of bits of each information signal onto a quadrature amplitude modulation constellation and passing the resulting data stream through a Nyquist filter.

3. The method of Claim 2 wherein said quadrature amplitude modulation constellation is a differential sixteen point star constellation.

4. A method of communicating N information signals over a single pre-defined frequency channel having a bandwidth of BWc, each of the N information signals

being transmitted on a single sub-channel of bandwidth BWsc comprising the steps of:

a. modulating each of N information signals to form N modulated signals, each having a bandwidth equal to or less than ($BWc - BW_{GB}$)/N, wherein BW_{GB} corresponds to the collective bandwidth of guardbands inserted between adjacent sub-channels and inserted at each end of the bandwidth of the pre-defined frequency channel, each modulated information signal having a center frequency of F_c;

b. offsetting the center frequency of each modulated signal by a frequency offset individual to that modulated signal, the frequency offset being different for each modulated signal;

c. combining the modulated signals to form a composite signal;

d. transmitting the composite signal;

e. receiving the composite signal at a terminal;

f. offsetting the center frequency of the received composite signal to re-center to Fc a first selected one of the modulated information signals comprising the composite signal;

g. filtering the composite signal to remove the modulated information signals not re-centered to Fc; and

h. demodulating the first selected one of the modulated information signals.

5. The method of Claim 4 further comprising the steps of:

a. offsetting the center frequency of the received composite signal to re-center to Fc a second selected one of the modulated first information signals comprising the composite signal;

b. filtering the received composite signal to remove the modulated information signals not re-centered to Fc; and

c. demodulating the second selected one of the modulated information signals.

6. The method of Claim 4 further comprising the steps of:

a. a time division multiplexing the information signals prior to the modulating step of step b such that each information signal comprises two or more communications signals, and

b. time division de-multiplexing the de-modulated first selected one of the modulated information signals.

7. The method of Claim 1 wherein said modulating step and said offsetting step are effected simultaneously.

8. An transmission apparatus for transmitting N information signals over a pre-defined frequency channel, having a bandwidth of BW_c, comprising:

a. N information signal inputs to receive at least N information signals;

b. N modulators, each coupled to a corresponding one of the N information signal inputs wherein each of the information signals is modulated to form a single modulated sub-channel signal, each having a center frequency Fc and a bandwidth BWsc,

c. N sub-channel frequency offset multipliers, each coupled to a corresponding one of the N modulators to receive a modulated sub-channel signal and offset its center frequency from Fc by one of N unique sub-channel offset frequencies;

d. a sub-channel summer coupled to the N sub-channel frequency offset multipliers to receive said N offset modulated sub-channel signals and combine them to form a composite signal; and

e. a transmitter coupled to said summer to receive said composite signal and transmit it over said pre-defined frequency channel.

9. The apparatus of Claim 8 wherein each information signal comprises a plurality of time division multiplexed signals.

10. The apparatus of Claim 8 wherein the modulators, sub-channel offsets, and sub-channel summer are realized in digital signal processing circuitry.

11. The apparatus of Claim 8 wherein the information signals comprise digitized voice signals.

12. The apparatus of Claim 8 wherein the information signals comprise control signals directed to a terminal receiving the composite signal.

13. The apparatus of Claim 8 wherein each modulated sub-channel signal is offset from its center frequency Fc by an offset frequency F_n calculated as:

for odd numbered sub-channel offsets $F_n = N/2\ (BWsc + (N+1)\ BW_{GB})$; and

for even numbered sub-channel offsets $F_n = -\ (N-I)/2\ (BWsc + (N+I)\ BW_{GB})$,

wherein BW_{GB} is the bandwidth of guardbands inserted between adjacent sub-channels.

14. The transmission apparatus of Claim 8 wherein N information signals are transmitted over a first pre-defined frequency channel and K additional information signals are transmitted over a second pre-defined frequency channel.

15. The apparatus of Claim 8 wherein said pre-defined frequency has a bandwidth of 25 kHz and N equals four.

16.The apparatus of Claim 8 wherein said pre-defined frequency has a bandwidth of 12.5 kHz and N equals two.

17. The apparatus of Claim 8 wherein the N information signals are logically organized as sequential time frames, each time frame comprising:

a. a first time slot containing a first signal intended for a first terminal; and

b. a second time slot containing a second signal intended for a second terminal.

18. The apparatus of Claim 17 wherein each time frame further comprises a third time slot containing control information, the control information being associated with at least one of the first and second time slots and being directed to a terminal receiving at least one of the N information signals.

19. The apparatus of Claim 17 wherein at least one of the first and second time slots contains data and control signals.

20. An receiver apparatus for receiving one of N information signals forming a modulated composite signal and transmitted over a pre-defined frequency channel comprising:

a. a receiver for receiving the composite signal;

b. a sub-channel offset controller coupled to said receiver wherein the composite signal is offset by a sub-channel offset corresponding to a first desired one of the N information signals;

c. a demodulator coupled to the offset controller wherein the first desired one of the N information signals is filtered and converted to a digital data stream.

21. The apparatus of Claim 20 wherein:

a. the sub-channel offset controller offsets the composite signal by a second sub-channel offset corresponding to a second desired one of the N information signals; and

b. the demodulator filters and converts to a digital data stream the second one of the desired information signals.

22. The apparatus of Claim 20 wherein said information signal comprises a plurality of time division multiplexed communication signals and further comprising: a time division demultiplexer wherein the time division multiplexed communication signals are logically separated into individual communication signals.

23. A method for transmitting a digital data stream having a data rate R, over N pre-defined frequency channels:

a. dividing the N pre-defined frequency channels into two or more sub-channels, each sub-channel being offset from the center of its associated frequency channel by a unique frequency offset, and each sub-channel having a data capacity equal to C;

b. allocating a sufficient number of sub-channels, Y, to transmit the digital data stream, such that Y * C = R;

c. apportioning the digital data stream over the Y sub-channels; and

d. simultaneously transmitting the digital data stream over the Y sub-channels comprising the N pre-defined frequency channels.

24. The method of Claim 23 wherein other sub-channels are allocated for transmission of other digital data streams.

25. The method of Claim 23 wherein other sub-channels are allocated for transmission of voice communications.

26. The method of Claim 23 wherein the multiple pre-defined frequency channels are contiguous.

27. The method of Claim 23 wherein said pre-defined frequency channels are government licensed portions of the RF spectrum.

28. The method of Claim 23 wherein said pre-defined frequency channels are 25 kHz, 12.5 kHz, or 6.25 kHz in bandwidth.

29. The method of Claim 23 further comprising the steps of:

a. simultaneously receiving the signal transmitted on the N sub-channels; and

b. re-constructing the digital data stream from the N portions received.